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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Toru Koizumi

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NEW YORK, NY 10112

EXAMINER

QUIETT, CARRAMAH J

ART UNIT

PAPER NUMBER

2622

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/929,037	Applicant(s) KOIZUMI ET AL.	
	Examiner Carramah J. Quiett	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3 and 5-28 is/are pending in the application.
- 4a) Of the above claim(s) 9-16 and 21-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3, 5-8, 17-20 and 25-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/24/2007 has been entered.

Response to Amendment

2. The amendment(s), filed on 04/24/2007, have been entered and made of record. Claims 3 and 5-28 are pending, of which claims 9-16 and 21-24 are withdrawn from consideration. The Applicant has canceled claims 1, 2, and 4.

Response to Arguments

3. Applicant's arguments filed 04/24/2007 have been fully considered but they are not persuasive.

Applicant asserts that the cited references do not disclose or suggest, "wherein the driving signal of the third level is supplied to the transfer switch after termination of a carrier storage period in the photoelectric conversion unit, during a period of a transition of the driving signal from the second level into the first level, and while the reset element is an OFF state." The Examiner respectfully disagrees. In col. 11, lines 32-50, Masuyama teaches that the potential level VL at the output of each buffer is positively biased even in the logically low state. Then,

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Masuyama teaches that at t2 a signal applied to the gate electrode of the transfer gate is biased.

Also, please see figures 1-3 and 15.

As far as the reset element being an OFF state, the Examiner has addressed this limitation in a 112 Rejection below. Additionally in the Remarks filed 04/24/2007, the Applicant did not explain where the asserted limitation is found in the specification of the present application. Respectfully, the rejections to claims 3, 5-8, 17-20, and 25-28 are maintained.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 3 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 28 recites the limitation, "wherein the driving signal of the third level is supplied to the transfer switch after termination of a carrier storage period in the photoelectric conversion unit, during a period of a transition of the driving signal from the second level into the first level, and while the reset element is an OFF state." The last part of the limitation, "while the reset element is an OFF state" is not described in the specification based on the requirements of the

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first paragraph of 35 U.S.C. 112. Accordingly, “while the reset element is an OFF state” will not be considered for the prior art rejection.

Claim Objections

6. Claim 3 is objected to because of the following informalities: For claim 3, please change “*An* image pickup apparatus” to “*The* image pickup apparatus.” Appropriate correction is required.

7. Claims 6-8 and 18-20 are objected to because of the following informalities: For each of claims 6-8 and 18-20, please change “*A* device” to “*The* device.” Appropriate correction is required.

8. Claim 28 is objected to because of the following informalities: For claim 28, Applicant uses the term “a carrier” in the third line of claim 28 and then uses the term “a carrier storage period” in the fifteenth line of claim 28. Assuming that the Applicant is claiming only the same carrier, the Examiner respectfully suggests changing “a carrier storage” to “a storage period of the carrier”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. **Claims 3, 25 and 28** are rejected under 35 U.S.C. 102(e) as being anticipated by Masuyama (U.S. Pat. #6,674,471).

Note: Claim 28 will be discussed first.

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For **claim 28**, Masuyama discloses an image pickup apparatus (figs. 1-2) comprising:

a photoelectric conversion unit fig. 2, ref. 3; col. 5, lines 1-2);

a transfer switch (fig. 2, ref. 4) for transferring a carrier in the photoelectric conversion unit (col. 5, lines 1-25);

an amplifying unit (fig. 2, refs. 5/6a) for amplifying a signal based on the carrier and having an input unit (ref. 5) which inputs the carrier transferred by the transfer switch (col. 5, line 14-47);

a reset element (fig. 2, ref. 7) for resetting the input unit, wherein the reset unit resets the input unit when the reset unit is in an ON state (col. 5, line 48-58); and

a driving circuit (fig. 1, refs. 41/42) for driving the transfer switch (col. 5, line 59 – col. 6, line 3; col. 11, lines 22-67),

wherein the driving circuit supplies the transfer switch with a driving signal having a level which is changed between a first level for changing the transfer switch into an OFF state (col. 11, lines 22-32), a second level for changing the transfer switch into an ON state (col. 11, lines 51-59), and a third level intermediate between the first and second levels (col. 11, lines 32-50), and

wherein the driving signal of the third level is supplied to the transfer switch after termination of a carrier storage period in the photoelectric conversion unit (col. 11, lines 32-50), during a period of a transition of the driving signal from the second level into the first level (col. 11, lines 37-50), and *while the reset element is an OFF state*. Please read col. 11, line 51 – col. 12, line 4) and see figs. 11 and 15.

For **claim 3**, Masuyama discloses a device wherein said photoelectric conversion unit includes an embedded photodiode (col. 5, lines 1-12).

Regarding **claim 25**, Masuyama teaches a drive method for an image pickup device including a plurality of pixels (fig. 1, ref. 1; col. 4, lines 54-67) each including a photoelectric conversion unit (col. 5, lines 1-2), a semiconductor area to which a signal from said photoelectric conversion unit is transferred (col. 5, lines 1-25), a transfer switch to transfer the signal from said photoelectric conversion unit to said semiconductor area (col. 5, lines 1-25), and a read unit (fig. 2, refs. 6a/b) to read out the signal from said semiconductor area (col. 5, line 26-47), comprising:

an output step of outputting a first drive signal level at which said transfer switch is set in an OFF state (col. 11, lines 22-32), a second drive signal level at which said transfer switch is set in an ON state (col. 11, lines 51-59), and a third drive signal level between the first level and the second level (col. 11, lines 33-50),

wherein the third drive signal level is held for a part of a predetermined time while said transfer switch is changing from the ON state to the OFF state (col. 11, line 51 – col. 12, line 4).

Also, please see the timing relationship for TR_i in figs. 11 and 15.

Claim Rejections - 35 USC § 103

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

12. **Claims 5-8 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamasaki et al. (U.S. Patent #5,187,583) in view of Suzuki et al. (U.S. Patent #5,828,407).

For **claim 5**, Hamasaki discloses an image pickup device (fig. 1) comprising:

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a plurality of pixels (ref. 5 – FDA) each including a photoelectric conversion unit (fig. 1, not numbered; (col. 3, lines 8-19), a semiconductor area (1 – ST) to which a signal from said photoelectric conversion unit is transferred (col. 3, lines 21-35), a transfer switch (2 – OG) to transfer the signal from said photoelectric conversion unit to said semiconductor area (col. 3, lines 21-35), and a read unit (ref. 4) to read out the signal from said semiconductor area (col. 3, lines 21-35); and

a drive circuit coupled to said pixels (ref. 8; col. 3, lines 20-39).

However, Hamasaki does not expressly disclose a drive circuit to output a signal for controlling said transfer switch so that a time during which said transfer switch changes from an ON state to an OFF state becomes longer than a time during which said transfer switch changes from the OFF state to the ON state.

In a similar field of endeavor, Suzuki discloses a transfer switch (fig. 1, refs. 10/11; col. 7, lines 7-14) and a drive circuit (fig. 1, refs. 2-4; col. 6, lines 58-65) to output a signal for controlling said transfer switch so that a time during which said transfer switch changes from an ON state to an OFF state becomes longer than a time during which said transfer switch changes from the OFF state to the ON state (col. 9, lines 15-63). Also in Suzuki, please see figs. 3-5. In light of the teaching of Suzuki, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the driving circuit of Hamasaki in order to improve the dynamic range of the image thereby realizing high charge transfer efficiency without causing blooming (Suzuki, col. 4, lines 49-56).

For **claim 6**, Hamasaki, as modified by Suzuki, discloses a device wherein said read unit includes an amplification transistor (fig. 2, ref. 4) for amplifying and outputting the signal in said semiconductor area (col. 3, line 8-19).

For **claim 7**, Hamasaki, as modified by Suzuki, Hamasaki teaches an embedded photodiode in a photoelectric conversion unit (fig. 1; col. 3, line 8-19).

For **claim 8**, Hamasaki, as modified by Suzuki, discloses a device (Suzuki, fig. 1) further comprising an analog/digital conversion circuit (ref. 6) *adapted to** convert a signal from each of said plurality of pixels into a digital signal (col. 7, lines 1-3), a signal processing circuit (ref. 7) *adapted to** process the signal from said analog/digital conversion circuit (col. 7, lines 1-5), and a recording circuit (ref. 9) *adapted to** record the signal processed by said signal processing circuit (col. 7, lines 1-7).

Regarding **claim 26**, this claim is a method claim corresponding to the apparatus claim 5. Therefore, claim 26 is analyzed and rejected as previously discussed with respect to claim 5.

13. **Claims 17-20 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gowda et al. (U.S. Patent #6,344,877).

For **claim 17**, Gowda discloses an image pickup device (fig. 2) comprising:
a plurality of pixels (fig. 2, ref. 30; col. 4, lines 1-7) each including a photoelectric conversion unit (fig. 3, ref. 26), a semiconductor area to which a signal from said photoelectric conversion unit is transferred (col. 4, line 62 – col. 5, line 18), a transfer switch (fig. 3, ref. 22) to transfer the signal from said photoelectric conversion unit to said semiconductor area (col. 5, lines 19-59), and a read unit (fig. 3, ref. 23) to read out the signal from said semiconductor area

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(col. 5, line 50-59); and a drive circuit coupled to said pixels (fig. 2, ref. 14; col. 4, lines 27-62) and to output a signal to control said transfer switch so that a fall speed V_{off} for changing said transfer switch from an ON state to an OFF state has a relation 1.2, 1.8, 2.5, 3.3, or 5 volts on the order of $2\mu\text{sec}$ (col. 7, lines 16-23 and col. 8, lines 29-40).

However, Gowda does not expressly teach that changing said transfer switch from an ON state to an OFF state has a relation $10 \text{ V}/\mu\text{sec} > V_{\text{off}}$.

The Examiner takes Official Notice that it is well known in the art for a drive circuit to output a signal to control a transfer switch so that a fall speed V_{off} for changing the transfer switch from an ON state to an OFF state has a relation $10 \text{ V}/\mu\text{sec} > V_{\text{off}}$. It is noted by the Examiner that because Applicant failed to timely traverse the old and well-known statement, it is now taken as Admitted Prior Art (see MPEP 2144.03(c)). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the driving circuit of Gowda in order to facilitate high-speed imaging.

For **claim 18**, Gowda discloses a device wherein said read unit includes an amplification transistor (fig. 3, ref. 23) for amplifying and outputting the signal in said semiconductor area (col. 5, lines 50-59).

For **claim 19**, Gowda discloses a device wherein said photoelectric conversion unit includes an embedded photodiode (fig. 3, ref. 26; col. 4, line 62 – col. 5, line 18).

For **claim 20**, Gowda discloses a device further comprising
an analog/digital conversion circuit (fig. 2, ref. 52) *adapted to** convert a signal from each of said plurality of pixels into a digital signal (col. 4, lines 12-15).

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a signal processing circuit (fig. 2, ref. 44) *adapted to** process the signal from said analog/digital conversion circuit (col. 4, lines 59-61), and

a recording circuit (fig. 2, after ref. 44) *adapted to** record the signal processed by said signal processing circuit – inherently, because after ref. 44 (col. 4, lines 59-61), the image signals are transferred to processing/image storage electronics. Please see fig. 2.

Regarding **claim 27**, this claim is a method claim corresponding to the apparatus claim 17. Therefore, claim 27 is analyzed and rejected as previously discussed with respect to claim 17.

***Note:** The Applicant's "*adapted to*" language as used in the claims broadens the scope of the claims. The MPEP states that, "Claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by language that does not limit a claim to a particular structure." (MPEP 2111.04 [R-3]) In other words at the U.S. Patent and Trademark Office, if a limitation is written with "*adapted to*" language, a reference is deemed to meet that limitation if the reference discusses the same element that, although not actually performing the claimed function, is **structurally capable of** performing it. Accordingly, the Examiner *will not* give a limitation with "*adapted to*" language patentable weight.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carramah J. Quiett whose telephone number is (571) 272-7316. The examiner can normally be reached on 8:00-5:00 M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NgocYen Vu can be reached on (571) 272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CJQ
June 22, 2007



NGOC-YEN VU
SUPERVISORY PATENT EXAMINER